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10/089,025	06/21/2002	Anthony Hooley	017-002	9464

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EXAMINER	
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ART UNIT	**PAPER NUMBER**
2644	

DATE MAILED: 02/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/089,025	HOOLEY ET AL.	
	Examiner	Art Unit	
	Jason R. Kurr	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 June 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-242* is/are pending in the application.

4a) Of the above claim(s) *1-223* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *224-242* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 June 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 7/12/02, 11/12/03; ~~11/8/05~~, 12/1/05
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

In regard to applicant's preliminary amendment, claims 1-223 have been respectfully canceled.

Claim Objections

Claims 225, 228 and 236 are objected to because of the following informalities: Claims 225 and 228 recite the limitation "said predetermined number times". There is insufficient antecedent basis for this limitation in the claim.

Claim 236 recites the limitation "the wavelength of sound frequency". There is insufficient antecedent basis for this limitation in the claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 229, 230 and 235 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "substantially" in each claim is a relative term, which renders the claim indefinite. The term "substantially" is not defined by the claim, the specification does

not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 224-242 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sekine et al (US 5,822,438) in view of Kazuhide (JP Pub. #05-199598).

With respect to claim 224, Sekine discloses a method of causing plural input signals representing respective channels (fig.1A "CH10-17") to appear to emanate from respective different positions in space (col.1 ln.11-14), said method comprising: providing an array of output transducers distal from positions in space (fig.1A "SP(L),SP(R)"); directing, using said array of output transducers, sound waves of each channel towards the respective position in space; said step of directing comprising: obtaining, in respect of each transducer, a delayed replica of each input signal delayed by a respective delay selected in accordance with the position in the array of the respective output transducer and said respective position in space such that the sound waves of the channel are directed towards the position in space in respect of that channel (col.2 ln.30-38, fig.1A "DL10-13"); summing, in respect of each transducer, the

respective delayed replicas of each input signal to produce an output signal; and routing the output signals to the respective transducers (fig.1A "AD10-13").

Sekine does not disclose expressly wherein there are sound reflective or resonant surfaces at the respective positions in space.

Kazuhide discloses a sound reproduction system providing a sound reflective or resonant surface at positions in space (drawing 4 #71-74); providing an array of output transducers distal from said positions in space (drawing 4 #31-33) and directing, using said array of output transducers, sound waves of each channel towards the respective position in space to cause said sound waves to be retransmitted by said reflective or resonant surface (paragraph [0008]).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the reflective surfaces of Kazuhide in the invention of Sekine.

The motivation for doing so would have been to create a surround sound effect that would give a user the feeling that sound is emanating from the directions of the reflective surfaces. This would allow for a stereo surround sound system that is capable of using only one set of speakers, hence reducing total speaker cost and space limitations.

With respect to claim 225, Sekine discloses a method according to claim 224, wherein said step of obtaining, in respect of each output transducer, a delayed replica of the input signal comprises: replicating said input signal said predetermined number times to obtain a replica signal in respect of each output transducer (fig.1A); delaying each replica of said input signal by said respective delay selected in accordance with

the position in the array of the respective output transducer and said respective position in space (fig.1A "DL10-13").

With respect to claim 226, Sekine discloses a method according to claim 224 further comprising: calculating, before said delaying step, the respective delays in respect of each input signal replica by: determining the distance between each output transducer and the position in space in respect of that input signal; deriving respective delay values such that the sound waves from each transducer for a single channel arrive at said position in space simultaneously (col.9 ln.3-21).

With respect to claim 227, Sekine discloses a method according to claim 224 further comprising: inverting one of said plural input signals; obtaining, in respect of each output transducer, a delayed replica of said inverted input signal delayed by a respective delay selected in accordance with the position in the array of the respective transducer, so that sound waves derived from said inverted input signal are directed at a position in space so as to cancel out at least partially sound waves derived from that input signal at that position in space (col.15 ln.35-55 , fig.1A).

With respect to claim 228, Sekine discloses a method according to claim 227, wherein said step of obtaining, in respect of each output transducer, a delayed replica of said inverted input signal comprises: replicating said inverted input signal said predetermined number times to obtain a replica signal in respect of each output transducer; delaying each replica (fig.3A "DL30-33") of said inverted input signal by a respective predetermined delay selected in accordance with the position in the array of the respective output transducer (col.2 ln.30-38, col.15 ln.35-55).

With respect to claim 229, Sekine discloses a method according to claim 227, wherein said inverted input signal is scaled so that the sound waves derived from said inverted input signal substantially cancel sound waves derived from that input signal at said position in space (col.15 ln.44-48). It is inherent that the anti-phase cancellation of Sekine must implement scaling of the anti-phase signal with respect to the signal to be cancelled. The coefficient multipliers (fig.1A "M1-M12") scale the input signals prior to the phase inversion of the cross talk canceller (fig.1A #2), hence the inverted signal is scaled to cancel its related input signal.

With respect to claim 230, Sekine discloses a method according to claim 229, wherein said scaling is selected by determining, in respect of the input signal which has been inverted, the magnitude of sound waves at said position in space and selecting said scaling so that sound waves derived from said inverted input signal have substantially the same magnitude at that position (col.15 ln.35-56).

With respect to claim 231, Sekine discloses a method according to claim 224 in view of Kazuhide, wherein at least one of said surfaces is provided by a wall of a room or other permanent structure (Kazuhide: drawing 4 #71-74).

With respect to claim 232, Sekine discloses an apparatus for causing plural input signals (fig.1A "CH10-17") representing respective channels to appear to emanate from respective different positions in space (col.1 ln.11-14), said apparatus comprising: an array of output transducers distal from said positions in space (fig.1A "SP(L),SP(R)"); and a controller for directing, using said array of output transducers, sound waves of each channel towards that channel's respective position in space (fig.1A "MTR1", col.4

ln.41-52); said controller comprising replication and delay means (fig.1A "DL10-13") arranged to obtain, in respect of each transducer, a delayed replica of the input signal delayed by a respective delay selected in accordance with the position in the array of the respective output transducer and said respective position in space such that the sound waves of the channel are directed towards the position in space in respect of that input signal (col.2 ln.30-34); adder means arranged to sum, in respect of each transducer, the respective delayed replicas of each input signal to produce an output signal (fig.1A "AD10-13"); and means to route (fig.1A "signal path from AD10,13 to #2")the output signals to the respective transducers such that the channel sound waves are directed towards the position in space in respect of that input signal.

Sekine does not disclose expressly wherein there are sound reflective or resonant surfaces at the respective positions in space.

Kazuhide discloses a sound reproduction system providing a sound reflective or resonant surface at positions in space (drawing 4 #71-74) such that sound waves are re-transmitted by said reflective or resonant surface; providing an array of output transducers distal from said positions in space (drawing 4 #31-33) and directing, using said array of output transducers, sound waves of each channel towards the respective position in space to cause said sound waves to be retransmitted by said reflective or resonant surface (paragraph [0008]).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the reflective surfaces of Kazuhide in the invention of Sekine.

The motivation for doing so would have been to create a surround sound effect that would give a user the feeling that sound is emanating from the directions of the reflective surfaces. This would allow for a stereo surround sound system that is capable of using only one set of speakers, hence reducing total speaker cost and space limitations.

With respect to claim 233, Sekine discloses an apparatus according to claim 232, wherein said controller further comprises: calculation means for calculating the respective delays in respect of each input signal replica by: determining the distance between each output transducer and the position in space in respect of that input signal; deriving respective delay values such that the sound waves from each transducer for a single channel arrive at said position in space simultaneously (col.9 ln.3-21).

With respect to claim 234, Sekine discloses an apparatus according to claim 232, wherein said controller further comprises: an inverter for inverting one of said plural input signals; second replication and delay means (fig.3A "DL30-33") arranged to obtain, in respect of each output transducer, a delayed replica of said inverted input signal delayed by a respective delay selected in accordance with the position in the array of the respective transducer and a second position in space so that sound waves derived from said inverted input signal are directed at said second position in space so as to cancel out at least partially sound waves derived from that input signal at said second position in space (col.15 ln.35-56). It is inherent that an inverter can be used to achieve a phase-inverted signal as does the cross talk canceller of Sekine.

With respect to claim 235, Sekine discloses an apparatus according to claim 234, wherein said controller further comprises a scaler (fig.1A "M1-M12") for scaling said inverted input signal so that the sound waves derived from said inverted input signal substantially cancel sound waves derived from that input signal at said second position in space (col.4 ln.41-44).

With respect to claim 236, Sekine discloses an apparatus according to claim 232 in view of Kazuhide, wherein said surfaces are reflective and have a roughness on the scale of the wavelength of sound frequency it is desired to diffusely reflect (drawing 4).

With respect to claim 237, Sekine discloses an apparatus according to claim 232, however does not disclose expressly wherein said surfaces are optically- transparent.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to include optically transparent windows in the walls of Kazuhide (drawing 4).

The motivation for doing so would have been to allow a user to visibly see into an opposing room or to view the environment outside of the room.

With respect to claim 238, Sekine discloses an apparatus according claim 233 in view of Kazuhide, wherein at least one of said surfaces is a wall of a room or other permanent structure (drawing 4 #71-74).

With respect to claim 239 Sekine discloses an apparatus for causing plural input signals (fig.1A "CH10-17") representing respective channels to appear to emanate from respective different positions in space (col.1 ln.11-14), said apparatus comprising: an array of output transducers (fig.1A "SP(L),SP(R)") distal from said positions in space;

and a controller for directing, using said array of output transducers, sound waves of each channel towards that channel's respective position in space (fig.1A "MTR1", col.4 ln.41-52); said controller comprising: replication and delay means (fig.1A "DL10-13") arranged to obtain, in respect of each transducer, a delayed replica of the input signal delayed by a respective delay selected in accordance with the position in the array of the respective output transducer and said respective position in space such that the sound waves of the channel are directed towards the position in space in respect of that input signal (col.2 ln.30-34); adder means arranged to sum, in respect of each transducer, the respective delayed replicas of each input signal to produce an output signal (fig.1A "AD10-13"); and means to route (fig.1A "signal path from AD10,13 to #2) the output signals to the respective transducers such that the channel sound waves are directed towards the position in space in respect of that input signal.

Sekine does not disclose expressly wherein there are sound reflective or resonant surfaces at the respective positions in space.

Kazuhide discloses a sound reproduction system providing a sound reflective or resonant surface at positions in space (drawing 4 #71-74) such that sound waves are re-transmitted by said reflective or resonant surface; providing an array of output transducers distal from said positions in space (drawing 4 #31-33) and directing, using said array of output transducers, sound waves of each channel towards the respective position in space to cause said sound waves to be retransmitted by said reflective or resonant surface (paragraph [0008]).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the reflective surfaces of Kazuhide in the invention of Sekine.

The motivation for doing so would have been to create a surround sound effect that would give a user the feeling that sound is emanating from the directions of the reflective surfaces. This would allow for a stereo surround sound system that is capable of using only one set of speakers, hence reducing total speaker cost and space limitations.

With respect to claim 240, Sekine discloses an apparatus according to claim 239, wherein said controller further comprises: calculation means for calculating the respective delays in respect of each input signal replica by: determining the distance between each output transducer and the position in space in respect of that input signal; deriving respective delay values such that the sound waves from each transducer for a single channel arrive at said position in space simultaneously (col.9 ln.3-21).

With respect to claim 241, Sekine discloses an apparatus according to claim 239, wherein said controller further comprises: an inverter for inverting one of said plural input signals; second replication and delay means (fig.3A "DL30-33") arranged to obtain, in respect of each output transducer, a delayed replica of said inverted input signal delayed by a respective delay selected in accordance with the position in the array of the respective transducer and a second position in space so that sound waves derived from said inverted input signal are directed at said second position in space so as to cancel out at least partially sound waves derived from that input signal at said

second position in space (col.15 ln.35-56). It is inherent that an inverter can be used to achieve a phase-inverted signal as does the cross talk canceller of Sekine.

With respect to claim 242, Sekine discloses an apparatus according to claim 241, wherein said controller further comprises: an inverter for inverting one of said plural input signals; second replication and delay means (fig.3A "DL30-33") arranged to obtain, in respect of each output transducer, a delayed replica of said inverted input signal delayed by a respective delay selected in accordance with the position in the array of the respective transducer and a second position in space so that sound waves derived from said inverted input signal are directed at said second position in space so as to cancel out at least partially sound waves derived from that input signal at said second position in space (col.15 ln.35-56). It is inherent that an inverter can be used to achieve a phase-inverted signal as does the cross talk canceller of Sekine.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Eberbach (US 5,809,150) discloses a surround sound loudspeaker system.

Yanagawa et al (US 5,953,432) discloses a line source speaker system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason R. Kurr whose telephone number is (571) 272-0552. The examiner can normally be reached on M-F 10:00am to 6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on (571) 273-8300. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JK
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PRIMARY EXAMINER